Exercises 11–18 refer to the data in Table 1.6 below showing the percentage of the female and male populations in the United States employed in the civilian work force in selected years from 1954 to 2004.

Table 1.6 Employment Statistics

Year	Female	Male
1954	32.3	83.5
1959	35.1	82.3
1964	36.9	80.9
1969	41.1	81.1
1974	42.8	77.9
1979	47.7	76.5
1984	50.1	73.2
1989	54.9	74.5
1994	56.2	72.6
1999	58.5	74.0
2004	57.4	71.9

Source: www.bls.gov

11. **(a)** According to the numerical model, what has been the trend in females joining the work force since 1954?

(b) In what 5-year interval did the percentage of women who were employed change the most?

12. **(a)** According to the numerical model, what has been the trend in males joining the work force since 1954?

(b) In what 5-year interval did the percentage of men who were employed change the most?

13. Model the data graphically with two scatter plots on the same graph, one showing the percentage of women employed as a function of time and the other showing the same for men. Measure time in years since 1954.

14. Are the male percentages falling faster than the female percentages are rising, or vice versa?

15. Model the data algebraically with linear equations of the form $y = mx + b$. Write one equation for the women's data and another equation for the men's data. Use the 1954 and 1999 ordered pairs to compute the slopes.

16. If the percentages continue to follow the linear models you found in Exercise 15, what will the employment percentages for women and men be in the year 2009?

17. If the percentages continue to follow the linear models you found in Exercise 15, when will the percentages of women and men in the civilian work force be the same? What percentage will that be?

18. **Writing to Learn** Explain why the percentages cannot continue indefinitely to follow the linear models that you wrote in Exercise 15.

19. **Doing Arithmetic with Lists** Enter the data from the "Total" column of Table 1.2 of Example 2 into list L_1 in your calculator. Enter the data from the "Female" column into list L_2. Check a few computations to see that the procedures in (a) and (b) cause the calculator to divide each element of L_2 by the corresponding entry in L_1, multiply it by 100, and store the resulting list of percentages in L_3.

(a) On the home screen, enter the command: $100 \times L_2 / L_1 \rightarrow L_3$.

(b) Go to the top of list L_3 and enter $L_3 = 100(L_2/L_1)$.

20. **Comparing Cakes** A bakery sells a 9″ by 13″ cake for the same price as an 8″ diameter round cake. If the round cake is twice the height of the rectangular cake, which option gives the most cake for the money?

21. **Stepping Stones** A garden shop sells 12″ by 12″ square stepping stones for the same price as 13″ round stones. If all of the stepping stones are the same thickness, which option gives the most rock for the money?

22. **Free Fall of a Smoke Bomb** At the Oshkosh, WI, air show, Jake Trouper drops a smoke bomb to signal the official beginning of the show. Ignoring air resistance, an object in free fall will fall d feet in t seconds, where d and t are related by the algebraic model $d = 16t^2$.

(a) How long will it take the bomb to fall 180 feet?

(b) If the smoke bomb is in free fall for 12.5 seconds after it is dropped, how high was the airplane when the smoke bomb was dropped?

23. **Physics Equipment** A physics student obtains the following data involving a ball rolling down an inclined plane, where t is the elapsed time in seconds and y is the distance traveled in inches.

t	0	1	2	3	4	5
y	0	1.2	4.8	10.8	19.2	30

Find an algebraic model that fits the data.

24. **U.S. Air Travel** The number of revenue passengers enplaned in the U.S. over the 14-year period from 1991 to 2004 is shown in Table 1.7.

Table 1.7 U.S. Air Travel

Year	Passengers (millions)	Year	Passengers (millions)
1991	452.3	1998	612.9
1992	475.1	1999	636.0
1993	488.5	2000	666.1
1994	528.8	2001	622.1
1995	547.8	2002	612.9
1996	581.2	2003	646.3
1997	594.7	2004	697.8

Source: www.airlines.org

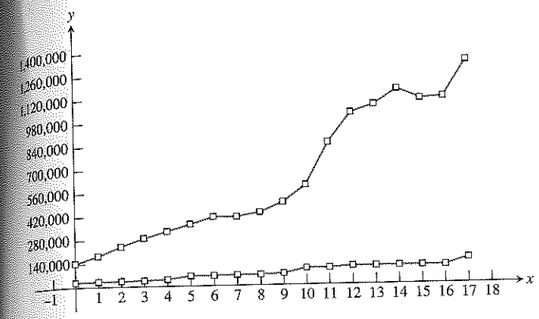
(a) Graph a scatter plot of the data. Let x be the number of years since 1991.

(b) From 1991 to 2000 the data seem to follow a linear model. Use the 1991 and 2000 points to find an equation of the line and superimpose the line on the scatter plot.

(c) According to the linear model, in what year did the number of passengers seem destined to reach 900 million?

(d) What happened to disrupt the linear model?

Exercises 25–28 refer to the graph below, which shows the *minimum* salaries in major league baseball over a recent 18-year period and the *average* salaries in major league baseball over the same period. Salaries are measured in dollars and time is measured after the starting year (year 0).



Source: Major League Baseball Players Association.

25. Which line is which, and how do you know?

26. After Peter Ueberroth's resignation as baseball commissioner in 1988 and his successor's untimely death in 1989, the team owners broke free of previous restrictions and began an era of competitive spending on player salaries. Identify where the 1990 salaries appear in the graph and explain how you can spot them.

27. The owners attempted to halt the uncontrolled spending by proposing a salary cap, which prompted a players' strike in 1994. The strike caused the 1995 season to be shortened and left many fans angry. Identify where the 1995 salaries appear in the graph and explain how you can spot them.

28. **Writing to Learn** Analyze the general patterns in the graphical model and give your thoughts about what the long-term implications might be for

(a) the players;

(b) the team owners;

(c) the baseball fans.

In Exercises 29–38, solve the equation algebraically and graphically.

29. $v^2 - 5 = 8 - 2v^2$

30. $(x + 11)^2 = 121$

31. $2x^2 - 5x + 2 = (x - 3)(x - 2) + 3x$

32. $x^2 - 7x - \frac{3}{4} = 0$

33. $x(2x - 5) = 12$

34. $x(2x - 1) = 10$

35. $x(x + 7) = 14$

36. $x^2 - 3x + 4 = 2x^2 - 7x - 8$

37. $x + 1 - 2\sqrt{x + 4} = 0$

38. $\sqrt{x} + x = 1$

In Exercises 39–46, solve the equation graphically by converting it to an equivalent equation with 0 on the right-hand side and then finding the x-intercepts.

39. $2x - 5 = \sqrt{x + 4}$

40. $|3x - 2| = 2\sqrt{x + 8}$

41. $|2x - 5| = 4 - |x - 3|$

42. $\sqrt{x + 6} = 6 - 2\sqrt{5 - x}$

43. $2x - 3 = x^3 - 5$

44. $x + 1 = x^3 - 2x - 5$

45. $(x + 1)^{-1} = x^{-1} + x$

46. $x^2 = |x|$

47. Swan Auto Rental charges $32 per day plus $0.18 per mile for an automobile rental.

(a) Elaine rented a car for one day and she drove 83 miles. How much did she pay?

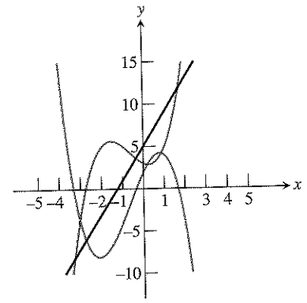
(b) Ramon paid $69.80 to rent a car for one day. How far did he drive?

48. **Connecting Graphs and Equations** The curves on the graph below are the graphs of the three curves given by

$y_1 = 4x + 5$

$y_2 = x^3 + 2x^2 - x + 3$

$y_3 = -x^3 - 2x^2 + 5x + 2.$



(a) Write an equation that can be solved to find the points of intersection of the graphs of y_1 and y_2.

(b) Write an equation that can be solved to find the x-intercepts of the graph of y_3.

(c) **Writing to Learn** How does the graphical model reflect the fact that the answers to (a) and (b) are equivalent algebraically?

(d) Confirm numerically that the x-intercepts of y_3 give the same values when substituted into the expressions for y_1 and y_2.